

WHAT IS CLAIMED IS:

1. A parallel plate varactor comprising:
 - a bottom electrode;
 - a top electrode;
 - a dielectric layer sandwiched between the bottom electrode and the top electrode, wherein a permittivity of the dielectric layer varies according to an electric field applied to the dielectric layer; the bottom electrode, dielectric layer, and top electrode are integrated on a substrate; and an overlap between the bottom electrode, dielectric layer, and top electrode defines an active region for the varactor; and
 - wherein, for at least one of the electrodes:
 - a resistance of the active region of the electrode is significantly higher than a resistance of a bulk region of the electrode;
 - the active region has a lateral area A, the electrode has a current conducting perimeter P; and a ratio R of the perimeter P to a square root of the area A is at least 2.0.